

AUTOMATIC PROCESS AND MACHINE FOR WEAVING ONE CONTINUOUS ROPE

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Specification

AUTOMATIC PROCESS AND MACHINE FOR WEAVING ONE CONTINUOUS ROPE

Cross- Reference to Related Applications

This application is entitled to the benefit of Provisional Patent Application
Serial # 60-123844

Statement Regarding Federally Sponsored Research and Development

“Not Applicable”

Reference to a Microfiche appendix

“Not Applicable”

BACKGROUND OF THE INVENTION

This invention relates to an automatic weaving process and machine for the manufacture of rope hammock beds in which a bobbin of rope passes through loops of rope from the same bobbin resulting in the traditional hammock bed weave (Fig. 1) from one continuous rope.

Hammock beds have traditionally been made for centuries by hand from one continuous rope. Workers thread a bobbin of rope through each separate weave of the bed. The process of weaving beds by hand is a strenuous job requiring the placing of a 10 to 15 pound bobbin of rope through a predetermined number of loops in each row to form the traditional hammock bed weave (Fig. 1). Workers are many times bothered by carpal tunnel disorders as well as other muscular and joint stress. By automating the hand weaving process, the operator is free to work on other processes involved in the

production of the hammock while the machine does the strenuous work of weaving the bed. There is a resulting savings not only in the prevention of injuries but a significant savings in labor costs.

The below-referenced U.S. patents, disclose embodiments that were at least in-part satisfactory for the purposes for which they were intended. The disclosures of all the below-referenced prior United States patents, in their entireties are hereby expressly incorporated by reference into the present application for purposes including, but not limited to, indicating the background of the present invention and illustrating the state of the art. The U. S. Pat. Nos. of the references are as follows:

T0030 3,550,166 5,133,389

4,112,816 5,273,078

4,170,249 5,351,722

4,512,373 5,076,330

SUMMARY

A set of opposing rods makes loops in a section of rope and then twists those loops on their sides in such a manner as to form a spiral tube of rope. A bobbin of the rope is then pulled through this tube. The tube of rope is then dropped leaving a single strand of rope. A second set of rods engages this new section of rope to make the next tube by pulling it apart and pulling the rope into it that had been dropped from the previous set of rods. In this back and forth manner a weave is created from one continuous rope. It creates a weave typical of rope hammock beds traditionally made by hand.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic of the traditional weave of a rope hammock bed

Fig. 2 is a top view of the relative position of many of the parts of the weaving machine.

Fig. 2B is a picture of the machine showing many of the moving parts.

Fig. 3 THROUGH 14 are pictures of the machine and process at different stages

Fig. 15 is a top view just after the starting procedure

Fig. 16 is a top views at the end of step 9 of the forward cycle

DETAILED DESCRIPTION OF THE INVENTION

The operation of the weaving process requires the movement of a forward and a backward cycle. These cycles are repeated as many times as are required for the size hammock bed which is being produced. There is a starting procedure at the beginning of the cycles to set the process up and a removing procedure once the bed is finished.

The following is a detailed description of the preferred starting procedure, forward and backward cycles and the removing procedure. It describes which parts move and what each part is doing when it moves. A cycle schedule is attached which shows the steps on a flow chart.

Starting Procedure

1. Load the bobbin into the bobbin case 21 and place into the west side of the machine in the bobbin case bed.
2. Pull a length of rope out of the bobbin and attach to the east holder bar 23.
3. The B set north and south rope pullers 17, 18 move forward past the rope and then back to pick up the rope.
4. The west rope turner positioner 8 moves forward to a spot where it can engage the motor.
5. The west rope turner twister 10 turns to a vertical position engaging the west rope turner motor.
6. The west rope turner pressure clamp 9 moves forward to tighten the rope onto the west rope turner twister 10.
7. The west rope turner motor turns the west rope turner twister counter clockwise at the same time that the B set north and south rope pullers 17, 18 move backward thus taking up rope which is being pulled out of the bobbin case 21.
8. The B set north and south rod twisters 16,19, turn B set north and south pullers 17,18 to the side position. This action creates a loop in the rope which is about 1 ½ inches wide. Figure 15 shows the position of the machine after this step.

Forward cycle

1. The East bobbin puller 5 moves forward and engages the bobbin case 21 clamping onto it.
2. The B set north and south rope pullers 17, 18 move forward, which relaxes the weave enough for the bobbin case 21 to be pulled through the opening
3. The east bobbin puller 5 pulls the bobbin case 21 backward through the opening of the ropes and travels all the way to the east side of the weaving machine and stops at its designated spot. Figure 5 shows the position of the machine after this step.
4. The east rope turner positioner 2 moves forward to a spot where it can engage the motor 1.
5. The east rope turner twister 4 turns to a vertical position engaging the east rope turner motor 1 .

6. The east rope turner pressure clamp 3 moves forward to tighten the rope onto the east rope turner twister
7. The west rope turner positioner 8 moves forward to a position to place the rope into a central position with the weaving machine.
8. The east rope lock 6 locks the rope on the east side of the machine just in front of the east rope turner twister 4.
9. The east rope turner motor 1 moves clockwise to pull the center rope taut. Figure 6 and Figure 16 show the position after this step.
10. The A set north and south rod twisters 15, 20 turn the A set north and south rope puller 13, 14 to the down position.
11. The A set north and south rope pullers 13, 14 move forward past the center rope. Figure 7 shows the position of the machine after this step.
12. The A set north and south rope pullers move backward to engage the center rope.
13. The east rope lock 6 unlocks.
14. The east rope turner motor 1 turns the east rope turner twister 4 counter clockwise at the same time that the A set north and south rope pullers 13, 14 move backward thus taking up rope which is being pulled out of the bobbin case 21. This movement is the sizing movement and determines the ultimate length of the hammock bed. The motor engages for a set number of cycles.
15. The B set north and south rope pullers 17, 18 move forward to a predetermined spot as the B set north and south rod twisters 19, 20 turn to a down position. This action drops the rope from the past set of loops onto the A set north and south rope pullers 13, 14. Figure 8 shows the position of the machine after this step.
16. The B set north and south rope pullers 17, 18 move all the way backward into position. Figure 9 shows the position of the machine after this step.
17. The B set north and south rod twisters 19, 16 turn the B set north and south rope pullers 17, 18 to the side position.
18. The west rope turner positioner 8 moves forward enough to engage the west rope turner motor 7.
19. The east rope lock 6 locks the rope just ahead of the east rope turner twister 4 locking it in place.
20. The west rope turner motor 7 turns the west rope turner twister 10 clockwise at the same time that the A set north and south rope pullers 13, 14 continue to move backward and thus taking up rope which is being pulled from the rope which was previously dropped by the B set north and south pullers 17, 18.
21. The A set north and south rod twisters 15, 16 turn A set north and south rope puller 13, 14 to the side position. This action creates a loop in the rope, which is about 1 1/2 inches wide.
22. The west rope turner pressure clamp 9 moves backward to release the rope from the west rope turner twister 10.
23. The west rope lock 12 unlocks the rope

24. The west rope turner twister 10 turns to the horizontal position and thus drops its rope onto the west holder bar 22. Figure 10 shows the position of the machine after this step.
25. The west rope turner positioner 8 moves backward all the way to allow for an opening for the impending bobbin and bobbin case 21.
26. The east rope turner positioner 2 moves backward all the way to allow for an opening for the impending bobbin and bobbin case.

Backward cycle

1. The west bobbin puller 11 moves forward and engages the bobbin case 21 clamping onto it. Figure 12 shows the position of the machine after this step.
2. The A set north and south rope pullers 13,14 move forward which relaxes the weave enough for the bobbin case to be pulled through the opening.
3. The west bobbin puller 11 pulls the bobbin case 21 backward through the opening of the ropes (Fig. 13) and travels all the way to the east side of the weaving machine and stops at its designated spot. Figure 14 shows the position of the machine after this step.
4. The west rope turner positioner 8 moves forward to a spot where it can engage the motor 7.
5. The west rope turner twister 10 turns to a vertical position engaging the west rope turner motor 7.
6. The west rope turner pressure clamp 9 moves forward to tighten the rope onto the west rope turner twister 10.
7. The east rope turner positioner 2 moves forward to a position to place the rope into a central position with the weaving machine.
8. The west rope lock 12 locks the rope on the west side just in front of the west rope turner twister.
9. The west rope turner motor 7 moves clockwise to pull the center rope taut.
10. The B set north and south rod twisters 19, 20 turn the B set north and south rope pullers 17, 18 to the down position.
11. The B set north and south rope pullers 13, 14 move forward past the center rope
12. The B set north and south rope pullers 13, 14 move backward to engage the center rope.
13. The west rope lock 12 unlocks.
14. The west rope turner motor turns the west rope turner twister 10 counter clockwise at the same time that the B set north and south rope pullers 17, 18 move backward thus taking up rope which is being pulled out of the bobbin case 21. This movement is the sizing movement and determines the ultimate length of the hammock bed. The motor engages for a set number of cycles.
15. The A set north and south rope pullers 13, 14 move forward to a predetermined spot as the A set north and south rod twisters 15, 16 turn to a down position. This action drops the rope from the past set of loops onto the B set north and south rope pullers 17, 18.
16. The A set north and south rope pullers 13, 14 move backward into position.
17. The A set north and south rope twisters 15, 16 turn the A set north and south rope pullers to the side position.

18. The east rope turner positioner 2 moves forward enough to engage the east rope turner motor 1.
19. The west rope lock 12 locks the rope just ahead of the west rope turner twister 10 locking it in place.
20. The east rope turner motor 1 turns the east rope turner twister 4 clockwise at the same time that the B set north and south rope pullers 17, 18 continue to move backward and thus taking up rope which is being pulled from the rope which was previously dropped by the A set north and south pullers 13, 14.
21. The B set north and south rod twisters 19, 20 turn B set north and south pullers to the side position. This action creates a loop in the rope, which is about 1 ½ inches wide.
22. The east rope turner pressure clamp 3 moves backward to release the rope from the east rope turner twister 4.
23. The east rope lock 6 unlocks the rope.
24. The east rope turner twister 4 turns to the horizontal position and thus drops its rope onto the east holder bar 23.
25. The east rope turner positioner 2 moves backward all the way to allow for an opening for the impending bobbin and bobbin case.
26. The west rope turner positioner 8 moves backward all the way to allow for an opening for the impending bobbin and bobbin case 21.

Removing procedure

1. The A set north and south rope pullers 13, 14 move forward to a predetermined spot as the A set north and south rod twisters 15, 16 turn the A set north and south rope pullers to the down position. This action drops the rope from the past set of loops.
2. Any extra rope is pulled out of the bobbin.
3. The holder bars 22, 23 are removed with the hammock bed attached.
4. New holder bars are placed in position to start a new bed.